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ABSTRACTS
from
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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

On a Red Pigment from the Skin of Some Marine Fishes.

(pp. 515～520)

By T. Mori and B. Sato.

(Tokyo Imperial University; Received Apr. 12, 1939.)

On the Carotinoid of Palm Oil (*Elaeis guinensis* Jack).

Appendix. Lycopin in the fruits of *Seafortia elegans*, R. Br.

(pp. 521～525)

By Ryo Yamamoto, Minoru Isii, and Hirosi Ito.

(Department of Food Chemistry, Taihoku Imperial University, Taiwan; Received May 10, 1939.)

During past years many investigations on the coloring matter of palm oil were attempted, but these investigations are still insufficient to clear up the nature of this pigment. Fresh fruits, produced in Sumatra, were used as a starting material. The pulp was extracted with petroleum ether and the oil was saponified according to Strain (J. Biol. Chem. 105, 523, 1934). The resulting carotinoids were separated by chromatographic method. The mixture of α-carotene and β-carotene was found to be the main coloring matter. The separation of these two isomers was insufficient with the adsorption of aluminium oxide, but it was successful by the aid of magnesium oxide as Strain mentioned.

Further more, the existence of lycopin which has not been isolated by previous authors, was confirmed.

In connection with the above experiments, we tried to separate carotinoid from the fruits of Yusurayasi (*Seafortia elegans*, R. Br.) cultivated in Taiwan and we found that it contains a comparatively by large amount of lycopin (m. p. 171°) besides a small quantity of carotene. By this fact we more strongly confirmed the existence of lycopin in palm fruit which perhaps originated from the rinds of the fruits.

Zuckerrohrwachs. III. Mitteilung.

Neue Bestandteile der unverseifbaren Substanz des Zuckerrohrwachses.

(ss. 526～530)

Von T. Mitui.

(Aus dem Agrikulturchem. Laboratorium der Kaiserl. Universität, Kyoto;
Eingegangen am 10. Mai 1939.)

In meiner I. Mitteilung berichtete ich, daß es mir gelang, aus der unverseifbaren Substanz des Zuckerrohrwachses Sitosterin und Stigmasterin zu gewinnen. Meine weiteren Untersuchungen nun liessen mich zwei neue Bestandteile in der unverseifbaren Substanz des Zuckerrohrwachses finden, welche folgenden Charakter haben:

	Schmelzpunkt	Formel	Doppelbindung	Natur der Sauerstoffe
I	206°	$C_{29}H_{52}O_2$	0	2 —OH
II	106°	$C_{29}H_{48}O$	1	1 —CO—

Ihren Eigenschaften nach kann man die Stoffe chemisch als dem Sterin verwandte Stoffe betrachten. Daher möchte ich nach seinem Vorkommen im Zuckerrohr (Saccharum officinarum) den I. Stoff "*α-Saccharostandiol*" und den II. Stoff "*β-Saccharostenon*" nennen.

Die Schmelzpunkte ihrer Derivate sind:

α-Saccharostandiol-dibenzoat	160°
″ -di-m-dinitrobenzoat	171°
β-Saccharostenon-oxim	163—165°
″ -2, 4-dinitrophenylhydrazon	206°
″ -tribromid	160.5°

Studies on the Preparation of Unsaturated Higher Fatty Alcohol by Zinc Catalyst.

(pp. 531～541)

By Yuichi Shinozaki and Shizuo Sumi.

(Dept. of Organic Chem., the Central Laboratory, South Manchuria Railway Co., Dairen;
Received May 11, 1939.)

Part I. On the Formation of Unsaturated Higher Fatty Alcohol from Perilla Oil.

Part II. The Influence of the Addition of Lower Aliphatic Alcohol upon the Catalyst.

Chemical Researches on the Pulp Woods of Manchoukuo. Part V.

Chemical Analysis and Cooking Experiment of "Dahurica-Karamatsu".

(pp. 542～546)

By M. Shikata, M. Yamane, and H. Kin.

(Agricultural Chemical Institute, Kyoto Imperial University;
Received May 27, 1939.)

In this paper, the researches on the chemical components, fibre lengths, and cooking experiments of Dahurica-Karamatsu (Howan-Howasun, *Larix dahurica* Turcz) are given.

1. The fibre length.

The distribution of fibre length is as shown in Table 1.

Table 1. The Distributions of Fibre-length.

Length (mm)	Dahurica-Karamatsu (%)	Length (mm)	Dahurica-Karamatsu (%)
0.5~1.0	1.4	3.5~4.0	14.2
1.0~1.5	4.8	4.0~4.5	13.2
1.5~2.0	4.6	4.5~5.0	5.0
2.0~2.5	13.2	5.0~5.5	0.4
2.5~3.0	21.2	5.5~6.0	0.2
3.0~3.5	20.8	6.0~6.5	0.4

The data show that the fibre length of Dahurica-Karamatsu is nearly equal in length to those of soft woods.

2. Chemical components.

The results of the analysis are given in Table 2.

Table 2. Chemical Components. (abs.)

The place of production	Hing-an, Peh-Sheng	Hing-an, Tung-Sheng	The place of production	Hing-an, Peh-Sheng	Hing-an, Tung-Sheng
Alcohol-benzene soluble	3.70	2.05	β-Cellulose	3.68	11.30
Cold water soluble	20.22	7.45	γ-Cellulose	10.12	6.04
Hot water soluble	21.31	8.94	In total cellulose α-Cellulose	72.90	69.26
1% NaOH soluble	29.61	17.82	β-Cellulose	7.23	20.04
Galactan	8.93	2.39	γ-Cellulose	19.87	10.70
Mannan	5.77	2.34	Nitrogen	0.22	0.14
Pentosan	11.78	6.66	Crude Protein	1.39	0.88
Hemicellulose	26.48	11.39	Ash	0.35	0.21
Lignin	25.96	28.96	CH_3O	4.58	4.50
Total cellulose	50.92	56.40	CH_3O/Lignin × 100	17.64	15.54
α-Cellulose	37.12	39.06			

3. Cooking experiments.

The cooking experiments with Ca-sulphite process were carried out under the conditions given in Table 3.

The compositions of cooking liquor was as follows;

Total SO_2 . . . . 7% ;　　CaO 1%;

Ratio of liquor and air dry sample is 5 to 1 in weight.

Table 3. The Conditions of Cooking Experiments.

The place of production		Hing-an, Peh-Sheng			Hing an, Tung-Sheng		
No		D. 97	D. 98	D. 3	D. 97	D. 98	D. 5
Penetration	Temp. °C	110~120	105~120	110~120	110~120	105~120	110~120
	Time hr.	2	$1^{1}/_{2}$	3	2	$1^{1}/_{2}$	3
Main Cooking	Temp. °C	135	135	135	135	135	135
	Time hr.	6	5	5	6	5	5
	Press kg/cm^2	6	6	6	6	6	6

4. Properties of unbleached pulps are shown in Table 4.

Table 4. Properties of Unbleached Pulps. (abs.)

The place of production	Hing-an, Peh-Sheng			Hing-an, Tung-Sheng		
No	D. 97	D. 98	D. 3	D. 97	D. 98	D. 5
Yield	38.80	43.66	40.40	42.10	44.00	41.59
Screenings			2.00			2.33
Total cellulose	95.47	96.70	95.76	96.85	96.09	95.19
α-Cellulose	84.44	87.03	84.62	86.21	84.63	83.02
β Cellulose	8.94	4.17	6.44	4.43	5.80	5.21
γ-Cellulose	2.09	5.50	4.70	6.21	5.66	6.96
Ash	0.37	0.44	0.66	0.21	0.46	0.72
Roe's number	4.83	3.04	5.61	1.45	4.45	5.98

5. Bleached pulp.

The unbleached pulps were bleached by the two stages method. After applying chlorine gas, they were washed with diluted alkali and water, and steeped in bleaching powder solution.

The properties of bleached pulps are shown in Table 5.

Table 5. Properties of Bleached Pulps. (abs.)

The place of production	Hing-an Peh-Sheng			Hing-an, Tung-Sheng		
No	D. 97	D. 98	D. 3	D. 97	D. 98	D. 5
Yield	36.62	41.56	35.87	38.65	41.34	36.92
Yield to 1 m^3 wood kg	207.4	235.4	203.17	208.2	211.9	189.22
α-Cellulose	91.22	91.06	92.08	90.84	89.53	90.85
β-Cellulose	5.13	3.37	3.10	3.32	4.87	3.18
γ-Cellulose	3.65	5.57	4.82	5.84	5.60	5.98
Ash	0.20	0.15	0.24	0.11	0.18	0.24
Pentosan	4.08	4.39	0.65	4.23	4.40	1.77
Alcohol-benzene soluble			0.24			0.15
Copper number	0.50	0.61	1.23	0.84	0.92	1.17
Viscosity (centipoises)	15.0	38.0	27.7	28.1	23.8	45.0

We may conclude from Table 5. that the pulp from Dahurica-Karamatsu is not inferior to first class commercial rayon pulps.

Experimentelle Untersuchungen über die Wirkung von Radium- und Röntgen-Strahlen auf die Gärungsmikroorganismen (II. Mitt.)

Über die Säurebildung der *Asp. niger* Radiumrassen.

(ss. 547～552)

Von R. NAKAZAWA und M. SIMO.

(Department of Industry, Government Research Institute, Taiwan, Japan;
Received May 15, 1939.)

A Simple Colorimetric Method to estimate Vitamin A.

(pp. 553～562)

By Dr. Kokichi OSHIMA and Shinichi ITAYA.

(From the Chemical Laboratory of the Hakodate College of Fisheries, Japan;
Received June 5, 1939.)

Instead of the Lovibond tintometer, a set of closed tubes which contain the following standard solutions is used:

Unit with Lovibond tintometer				Contents		
Blue	10.0	Yellow	2.2		$25\{34\% CuSO_4 \cdot 5H_2O\}+4\{11.3\% Co(NO_3)_2 \cdot 6H_2O\}$	
″	9.0	″	2.0		$25\{30\% CuSO_4 \cdot 5H_2O\}+4\{10\% Co(NO_3)_2 \cdot 6H_2O\}$	
″	8.0	″	1.8	86	$[25\{30\% CuSO_4 \cdot 5H_2O\}+4\{10\% Co(NO_3)_2 \cdot 6H_2O\}]$	+14 Aqua
″	7.0	″	1.5	72	[″]	+28 ″
″	6.0	″	1.3	58	[″]	+42 ″
″	5.0	″	1.15	44.6	[″]	+55.4 ″
″	4.0	″	1.0	32	[″]	+68 ″
″	3.0	″	0.74	21	[″]	+79 ″
″	2.0	″	0.5	12	[″]	+88 ″
″	1.0	″	0.4	5	[″]	+95 ″
″	0.8	″	0.32	4	[″]	+96 ″
″	0.6	″	0.24	3	[″]	+97 ″
″	0.4	″	0.16	2	[″]	+98 ″
″	0.2	″	0.08	1	[″]	+99 ″

In a test tube of the same size as the standard, 0.5 cc liver oil in chloroform is mixed with 4.5 cc of 20% antimony trichloride in chloroform. Compare the blue color of the mixture with the standard in a comparator box. This comparison should be completed within 30 seconds. The vitamin A value of any given liver oil is expressed as follows:

$$\text{C. L. O. unit} = \frac{\text{Obtained blue unit}}{\%\ \text{of liver oil (wt/vol)}} \times 2$$

$$\text{Carr Price unit} = \frac{\text{Obtained blue unit}}{\%\ \text{of liver oil (wt/vol)}} \times 2 \times 9.1$$

$$\text{International unit} = \frac{\text{Obtained blue unit}}{\%\ \text{of liver oil (wt/vol)}} \times 2 \times 300$$

If the color of the mixture shows some different tones from the standard, then use also the yellow or red standard tubes adopted in the authors' method of estimating the fatty oil color.

The entire apparatus can be carried about easily, and the colors of the standard solutions do not fade even under direct sunlight.

On the Manufacture of Alcohol from Jerusalem Artichoke. (Part X.)

(pp. 563∼574)

By Toshinobu Asai and Susumu Kikuchi.

(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan;
Received May 24, 1939.)

The influence of the addition of nitrogenous substances to the alcoholic fermentation of the unsaccharified steamed mash was investigated. The mash was prepared so as to contain about 12∼14% of total sugars.

It was found that peptone-nitrogen was most effective to promote the fermentation velocity and increased the alcohol yield to above 90% conversion, while extracted soy-bean and ammonium sulphate increased fermentation a little, though bran and rice-bran rather inhibited fermentation. The optimum quantities of peptone-nitrogen to be added were found to be 0.1∼0.4 grams per 1000 cc of the mash.

Potassiumbiphosphate gave rapid fermentation at initial period but the total alcohol yield was not increased.

The mixed culture of yeasts improved the fermentation, most especially with Schizosaccharomyces Pombe and alcohol yeast No. 35.

Lastly we investigated the fermentation of the aqueous extract produced by diffusion process. The dried artichoke chips were extracted in diffusion battery with water at approximately 80°C; a syrup was obtained, containing about 20% total sugar equivalent. Remaining carbohydrate after the extraction showed only 0.3% of the residual chips.

The extract without dilution was fermented by Shizosaccharomyces Pombe.

The fermentation result was most excellent showing the alcohol yield of 88.6% of the theoretical in the fermenting duration of 88 hours.

Statistic Studies of Soils (VII).

(pp. 575～588)

By Dr. Misu-Hideo.

(Agricultural Experiment Station, Government General of Tyōsen;
Received June 2, 1939.)

Über die chemischen Zusammensetzung und die Verhältnisse zwischen der Faktoren der Getreidefennichen Samen.

(ss. 589～601)

Von Tetsujiro Ohara.

(Tokyo Nogyo Kyoiku Senmon Gakko; Eingegangen am 27, Apr., 1939.)

Über die Eigenschaften der Getreidefennichen Samen.

(ss. 602～608)

Von Tetsujiro Ohara.

(Tokyo Nogyo Kyoiku Senmon Gakko; Eingegangen am 27, Apr., 1939.)

Studies on Acetone-Butylalcohol Fermentation.

(1). The bacteriological properties of Bacillus butanolo-acetoni Yukawa-Horie nov. sp. and the fermentation of cassava by this organism.

(pp. 609～623)

By Matao Yukawa and Sigeyosi Horie.

(Agricultural Chemical Laboratory, Kyusyu Imperial University, Fukuoka;
Received May 29, 1939.)

The authors isolated a new strain of "acetone bacillus", for which a group-name Clostridium acetobutylicum (Weizmann) was proposed by McCoy and others, from maize bought at a local market in 1930.

The bacteriological and biochemical properties of this new strain of "acetone bacillus" was studied comparing with the so-called Bac. granulobacter pectinovorum, which was isolated by C. Weizmann in 1915.

The culture of the Weizmann bacillus used in this research has been developed from stock-culture obtained through the kindness of Prof. Speakman of Canada.

These two organisms are very nearly related in many respects, but in some properties, i. e., the fermentability of rhamnose and trehalose; the form of sporangia; the fermentability at low temperature; the easiness with which a most vigorous seed culture may be prepared; etc., they do not coincide with each other and hence we named it Bacillus butanolo-acetoni Yukawa-Horie nov. sp.

Lately Prof. Dr. I. Yamasaki and T. Karasima made clear the difference of ability of acetoin-formation between Bac. granulobacter pectinovorum and our new strain.

The bacteriological properties of this organism are as follows:

1. Morphology.

Vegetative cells. Medium: 4% cassava mash containing 1% bran as N-source. Temperature: 37°C. Age: 24 hrs. Form: Long rods. Arrangement: Single but occasional pairs or chains (3 cells). Limits of size: $3\sim8\,\mu\times0.8\sim1\,\mu$. Size of majority: $4\sim6\,\mu\times0.8\,\mu$. Gram stain: Positive. Lugol's iodine: Negative. Motility: Motile.

Sporangia. Medium and temperature: The same as above. Age: 48 hrs. Form: Drum sticks. Arrangement: Single but occasional pairs. Limits of size: $6\sim12\,\mu\times1.5\sim2.5\,\mu$. Majority of size: $6\sim8\,\mu\times2\,\mu$. Gram stain: Positive. Lugol's iodine: Positive. Motility: Non-motile.

Spores. Location: At one end of sporangium. Form: Elliptical form. Size: $2\sim2.5\,\mu\times1.5\,\mu$.

2. Cultural features.

Plate culture (aerobically and anaerobically on wort gelatine, wort agar, koji agar and maize agar): No growth.

Slant culture. Anaerobically on wort agar: Occasional growth. Koji agar: No growth. Potato: Abundant growth and gas formation in both aerobic and anaerobic tubes. Slimy, cream colored. Strong butyl odor. Sporangia are formed after 24 hrs.

Stab culture. Wort agar and koji agar: Abundant growth without exception. Gas splits the medium.

Milk. Rapid coagulation. Butyl odor.

Gelatine. Liquefied.

3. Physiology.

Temperature relation. Spores can be boiled (in water bath) 20 mins. Opt. temp. for fermentation is 37°C (±2°). 5.4% acetone on cassava was produced in 159 hrs. at 23°C. At 45°C., no fermentation.

Air relation. Vigorous growth in both aerobic and anaerobic tubes, Fermentation of various carbon sources. The fermentation tests were carried out in yeast water and Speakman's semi-synthetic medium. The following are fermented: xylose, arabinose, glucose, fructose, galactose, mannose, sucrose, maltose, lactose, raffinose, melizitose, α-methyl-glucoside, glycogen, inulin, dextrin, starch, pectin, mannite, rhamnose(?), trehalose(?), esculin(?). The following are not fermented: melibiose, glycerin, sorbit, Ca-lactate.

Fermentation products from 100 kg. cassave. About 7 kg. acetone, 14 kg. butylalcohol and 2 kg. ethylalcohol (within 72 hrs.).

Raw-materials in industrial fermentations: Cassava, maize, rice, kaoliang, potato, sweet potato, waste products from starch manufacture and others. Molasses can also be fermented but very poorly.

When such a material as cassava, which contains very little protein, is used, one of the following is added as N-source: Gluten meal, bran, chrysalis cake, soy bean cake, etc. In spite of the good yield of solvents from rice, rice bran itself is unsuitable for N-source.

The maximum limit of mash concentration in industrial practice lies between 6 to 8% (cassava) and 0.5% or less of gluten meal.

Bac. butanolo-acetoni needs not to be started from sand culture for each fermentation, that is, practically the same yield of solvents can be obtained by inoculating a seed culture of 4th to 25th generation, which is heat-shocked at each subculture, or of 4th to 10th generation, which is transferred without heat-shock. In the early generation, the seed culture, transferred without heat-shock, gives a greater yield of solvents than with it.

From many points of view, it is advisable to lower the viscosity of starchy mashes, especially in large scale fermentation, and the addition of a small amount of acid (sulphuric, acetic, etc.,) —0.02% on mash—to mash before cooking is the most simple and effective means for this purpose.

Employing this new strain, an acetone and butylalcohol producing factory was established in Japan for the first time in 1931.

Studies on the Cell-Wall Constituents of Soy-Bean. (II)

Cell-Wall Constituents of the Seed Coat.

(pp. 624~628)

By Syuiku SASAKI and Syōtarō Tō.

(Agricultural Chemical Laboratory, Kyūsyū Imperial University;
Received May 22, 1939.)

The soy-bean seed consists of 85~90% of embryo and 5~10% of seed coat. The present study relates to an investigation of the seed coat, especially to its cell-wall constituents.

Constituents of the Seed Coat.

	% of the seed coat (moisture free basis)
Pectin (0.5% am. oxalate extract)	17~20
Hemicelluloses (4% NaOH extract)	5.6~10.3
Crude fiber (Chlorination method)	51.9
α-Cellulose	31.2
β-Cellulose	18.2
γ-Cellulose	2.5
Crude protein	11.7
Crude oil	0.96
Ash	4.3

It will be observed from the above table that the main constituents of the seed coat are cellulose and pectin. The pectin could be isolated in a fairly pure state. The hemicelluloses were fractionated to the three types of hemicellulose A, hemicellulose B and hemicellulose C by means of acetic acid and acetone, and further purification was carried out with each fraction, but no pure substance was isolated.